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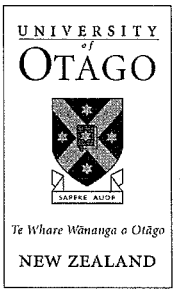

Climate Change and Behaviour Change: Empowering Youth Action through Narrative

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Abstract

This thesis is a review of the literature spanning multiple disciplines to provide an overview of climate change science in the global and New Zealand context, its implications, and a context for action amongst young New Zealanders. On the balance of scientific evidence, human activity is affecting the Earth's climate to the extent that it may have catastrophic consequences for development. Addressing the climate change problem requires unprecedented mitigation and adaptation, which many now argue is the defining challenge of our generation. By exploring social and behavioural change theory, and the use of narrative as a tool for empowering change, this thesis provides insights that could aid the transition towards low-carbon communities.

Generally, solutions reside in a fundamental shift away from the consumption of fossil fuels towards clean renewable energy and more sustainable management of the Earth's resources. This thesis notes considerable barriers to social and behavioural change and that strategic use of narrative provides insight to help overcome them. At the grassroots community level, the use of narrative is emerging as an effective tool to empower individual and collective action towards resilient, low-carbon communities. When narrative is designed to communicate desirable behaviour through relevant, local personal stories to defined target audiences, it may be a powerful tool for change.

This thesis concludes that with a deepened understanding of the problems and solutions surrounding climate change, paired with insights to empower behaviour change through narrative, communicators could aid the transition towards resilient low-carbon communities. If given the required urgency, it may still be possible to avoid some of the most catastrophic consequences associated with climate change.

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Chapter One: Introduction

Climate change is a complex and controversial issue. For over 30 years scientists have investigated the Earth's carbon cycle, explored the possibility that human actions might influence the climate, and projected the implications of possible warming or cooling. Uncertainty, scepticism, and denial, currently resides in many circles, yet many eminent scientists are undivided on the balance of evidence. Is the Earth warming? Is human activity the cause? To what extent, if at all, should we care? And what if anything, can we do about it?

These are some of the many questions underlying the climate change issue – an issue referred to by some as 'the defining challenge of our time' (UNDP, 2007; Stern, 2009). It is the purpose of this thesis to provide insight to answering these questions. Any thorough investigation must begin with the science, and as the body of research surrounding climate change grows at an increasing rate, the accumulating evidence becomes clearer and more concerning. As the demand for resolve grows ever urgent the impact of indecision becomes more profound, and the time to respond to the projected consequences slips away.

Findings from the reviewed literature suggest that climate change induced by human activity is unequivocal. The current emissions profile is aligning with the worst-case scenarios as projected by the world's most authoritative scientific research bodies (IPCC, 2007; Richardson et al., 2009). This is consistently reaffirmed by scientific evidence. Mitigation and adaptation strategies are critical for human survival, and the time remaining to avoid catastrophic consequences is running out. The suggested solutions reside in systematic change from both 'top down' and 'ground up' approaches to foster low-carbon lifestyles and communities, yet considerable barriers exist that oppose such change.

Theories from psychology provide insight as to how barriers to behavioural change might be overcome, and suggest a path for empowering action towards low-carbon lifestyles and communities. More recently evidence suggests that narrative can be an effective tool to empower change at both the individual and collective level, with new research emerging specifically around building community resilience against the challenges posed by climate change. Whilst there are many media to communicate narrative, research suggests film and filmmaking can have considerable impact, especially if narrative is strategically developed to effectively empowering change amongst a target audience. A significant part of this thesis – the film, *Carving the Future*, provides a context for taking action on climate change and

demonstrates how young New Zealanders 'can make a difference' through solution-focused action.

1.1 Structure of Thesis

The structure of this thesis is comprised of two parts:

(i) a creative component: a 25-minute film, *Carving the Future,* is designed as a tool to empower action amongst young New Zealanders. It profiles the science-based international social movement 350.org, through three young New Zealanders as they lead solution-focused action projects in their regions.

(ii) a literature review to support the design of the film, in which four main sections endeavour to provide a well-informed understanding of the issue, what can be done, and how.

The four sections of the written component include: an overview of the science of climate change; the context for action: responsibility, education, and urgency; social change & empowering action for low-carbon communities; and an exploration of the power of narrative to inspire change. The research provides some insight into the New Zealand context, as well drawing as on psychological theory and case studies to provide insight into the power of documentary filmmaking – as a narrative vehicle to empower action towards low-carbon communities.

Chapter Two: An Overview of Climate Change Science

Nested deep amidst the swirl of science, media, public interest groups, public opinion – the voiced and the silenced and seeping further into the workings of governments and policy, is the issue of climate change. It is an issue that has experienced significant controversy, exacerbated by contemporary media, and orchestrated by influential people and organizations. But to look deeper in search of understanding, it is important to start with the science.

In 1979, the United States National Academy of Sciences published an assessment linking carbon dioxide (CO_2) emitted by human activity - primarily the combustion of fossil fuels (i.e. oil, coal, gas), as causing change to the Earth's atmosphere. The report suggested that "[I]f carbon dioxide continues to increase, the study group finds no reason to doubt that climate changes will result and no reason to believe these changes will be negligible", continuing that "the conclusions of prior studies have generally been reaffirmed" (National Academy of Sciences, 1979). Although this early account of investigation was conducted by one of the most significant scientific research organizations at the time, whether there is a sufficient level of confidence to determine whether it the climate is changing due to human activities is dependent on the accumulation and constant review of evidence.

2.1 Scepticism and Denial

For over thirty years the evidence of human-induced climate change has increased. Yet significant 'scepticism' and 'denial' regarding human-induced climate change exists largely in the public arena through the popular media, including talkback radio, television, print, and especially the internet. Theories refuting the existence of human-induced climate change and pronouncing causes in the likes of 'the sun' and 'solar flares' are rife on the internet (Climate Change Skeptic, 2008). In New Zealand recently published books also refute the science (Wishart, 2009), but to date none of these theories reviewed in the literature have been proven to sufficiently break the link between climate change and human activity.

Outside of the public arena and within scientific research, scepticism regarding climate change has long moved beyond the question of whether humans are the cause, to concerns of what level to stabilise emissions; how to reduce emissions; and how to adapt to the projected consequences (Mascarelli, L., 2008; Morgan et al., 2009). Scientific studies have contested the extent to which CO_2 and human activities influence the climate. The scope for analysis

has broadened significantly, to geological records, pollen deposits, oceans, ice cores, sea levels, coral reefs, forests, biodiversity, human development, and much, much more. The balance of scientific evidence indicates the climate is changing, and that human activities are causing it (IPCC, 2007; Hansen et al., 2008; Morgan et al., 2009). Author George Monbiot, in reflecting on the state of the science writes "to doubt, today, that man-made climate change is happening, we must abandon science and revert to some other means of understanding the world: alchemy perhaps, or magic" (Monbiot, 2007). Although many persist in denying the science behind climate change, some quite vocally, investigation into the science reveals a clear and overwhelming consensus.

2.2 Greenhouse Gases and the Role of Carbon Dioxide (CO_2)

In its simplest form, the changing climate is largely the result of the accumulation of different kinds of gases in the Earth's atmosphere that trap heat. Solar energy emitted by the sun, penetrates the Earth's atmosphere and hits the Earth's surface. Some of that energy – mostly light, is reflected off the Earth's surface and back out into space, but a portion of the heat energy is trapped by gases in the Earth's atmosphere – this causes warming and is known as the greenhouse effect. Different types of greenhouse gases have varying influence on warming, although water vapour, CO_2, methane and nitrous oxide have the biggest effect (Renowden, 2007). The need for further analysis into other atmospheric gases – particularly into methane, phosphorous, nitrogen, as well as aerosols, has been identified, to be incorporated into models for long-term projections (Arneth et al., 2009; Rockström et al., 2009; Shindell et al., 2009). Carbon dioxide has received most of the scientific and public attention because of it's known combustion from fossil fuels, and its long atmospheric life (Mascarelli, L., 2008). Some of the CO_2 in the atmosphere is sequestered in 'carbon sinks' – whereby through processes such as the photosynthesis of plants, and absorption of phytoplankton, the atmospheric CO_2 is returned to land (especially forests) and oceans (Richardson et al., 2009). This process is a natural part of the carbon cycle.

It is important to note that levels of CO_2 in the atmosphere have fluctuated for millions of years over the course of the Earth's history, resulting in many periods of warming and cooling. However, significant increases in atmospheric CO_2, paired with the loss of keystone species (i.e. phytoplankton), and increased ocean alkalinity have been linked to all of the major extinctions throughout history (Bowring et al., 1999; Berner et al., 2001; Beerling, 2002; Whiteside et al., 2007). The CO_2 emitted by human activities through the combustion of

fossil fuels contributes to an atmospheric concentration that is increasingly, and undesirably high. Up until the pre-industrial era, the concentration of CO_2 in the atmosphere has fluctuated but remained below 280 parts per million by volume (ppmv), and now, since the rise of the industrial revolution and increasing dependence on fossil fuels, the concentration has risen to 385ppmv, and is increasing on average by about 2ppmv per year (IPCC, 2007; Hansen et al., 2008; Mascarelli, L., 2008). Further more, Hansen et al. (2008) note during previous concentrations of 450ppmv or higher, Earth was largely ice-free.

Research builds on the fact – as did the report in 1979 that for the past 10,000 years the Earth's climate and the concentration of CO_2 in the atmosphere have been relatively stable, but since the rise of the industrial revolution CO_2 concentration has risen significantly and the stability of the climate is increasingly under threat (IPCC, 2007; Hansen et al., 2008). Without this human-induced pressure, the Earth's climate would be expected to remain stable for at least thousands of years (Rockström et al., 2009).

2.3 The Advancing Science and Projected Scenarios

To date, the most comprehensive synthesis of climate change science and its implications is the Fourth Assessment Report (AR4) produced by the Intergovernmental Panel for Climate Change (IPCC). The AR4 comprised the efforts of leading scientific experts from more than 130 countries over six years. In its development, more than 450 lead authors received input from over 800 contributing authors, an additional 2,500 experts then reviewed the draft documents, before publishing it in 2007. The report draws on a vast range of evidence including rising global average air and ocean temperatures, melting of snow and ice, and rising global average sea level, to conclude that warming of the climate system is 'unequivocal' and with greater than 90% certainty that the cause is human activity – primarily the emission of greenhouse gases and the clearing of natural vegetation (IPCC, 2007). The IPCC's next major assessment report, the AR5 is currently being compiled and is to be finalised in 2014 (IPCC, 2009).

Owing to the continued advancement of the science, there is now significant evidence to suggest that climate change is happening faster than the AR4 projected, and more recent articles published in leading scientific journals now regard those projections as conservative (Rockström et al., 2009). Such evidence includes the record melt of Arctic summer sea ice in 2007 and the record low in the summer volume of sea ice in 2008, with Arctic climate

scientists now predicting an Arctic ocean ice-free in summer much sooner than anticipated (Serreze et al., 2008). In the Antarctic, the area affected by warming is much larger than previously reported (Steig et al., 2009). The AR4 is also critiqued for its lack of attention regarding the impact that feedbacks have on accelerating the rate of climate change (Rockström et al., 2009).

Feedbacks (also known as feedback loops) are reinforcing cycles or processes triggered by warming that further induce warming. Examples include the melting of large sheets of sea ice, therefore diminishing the ability to reflect light away from the earth's surface (also known as albedo effect); and the melting of permafrost or sea-ice releasing otherwise trapped stores of methane or carbon (Mascarelli, A., 2009). Other feedbacks include the diminishing ability of carbon sinks, whereby through processes such as deforestation and ocean acidification, "a greater fraction of emissions will remain in the atmosphere, requiring a greater reduction in emissions to achieve specific targets" (Richardson et al., 2009). Furthermore, it is suggested that climate change is particularly sensitive, and the effects of such feedbacks could lead to 'tipping points' or 'points of no return' that may be irreversible (Hansen et al., 2008; Rockström et al., 2009). Therefore failing to consider the implications of feedbacks accelerating the rate of climate change could have consequences for major decisions based on the conclusions of the IPCC's AR4.

This is further supported by the Copenhagen Synthesis Report released following the International Scientific Congress on Climate Change held in Copenhagen in 2009, which brought together approximately 2500 people from over 80 countries – most were researchers, and many of whom were contributors to the IPCC's AR4. The report states that many of the key climate indicators (global average temperature, sea-level rise, global ocean temperature, Arctic sea ice extent, ocean acidification) are already transgressing the thresholds in which contemporary societies and economies have developed and thrived (Richardson et al., 2009). Concluding that "recent observations show that greenhouse gas emissions and many aspects of the climate are changing near the upper boundary of the IPCC range of projections" (Richardson et al., 2009).

The future depicted by the AR4's more extreme projected scenarios has significant implications for mankind (Barnett, 2009; Richardson et al., 2009). At the lower range of projections suggested by the AR4, even if current CO_2 emissions were reduced by 80% to that of 1990 levels by 2050, 2°C of warming could still be expected; whereas at the upper end

assuming a 'business as usual' approach, global average rise in temperature of up to 6.4°C is possible (IPCC, 2007). A recent article suggests that "with continued intensive fossil fuel use, temperatures could rise by 4°C by 2070, or even as early as 2060 if there are strong positive feedbacks in the carbon cycle" (New et al., 2009).

A world with 2-4°C of warming has significant implications for humanity. Warming to this effect would intensify ocean acidification, loss in biodiversity, global water shortages, difficulties in agricultural production, increased precipitation, increased air-borne and vector-borne disease, displacement of culture and community, more extreme weather events, sea-level rise, and more (IPCC, 2007; Richardson et al., 2009; Rockström et al., 2009). Warming to 2-4°C would result in sea-level rise of at least one metre by 2100 and in the long term, could trigger permanent break-up of the Greenland ice sheet, resulting in rise of up to seven metres (Charbit et al., 2008). For countries like the Maldives, at only 1.5m above sea-level, or low-lying coastal communities the world over, the implications of any rise even close to that would be significant.

Founded upon the impacts already being felt, the Copenhagen Synthesis Report stated that "recent observations show that societies and ecosystems are highly vulnerable to even modest levels of climate change, with poor nations and communities, ecosystem services and biodiversity particularly at risk" (p.6, Richardson et al., 2009). In addition, "warming of 4°C or more would have consequences that might be beyond the ability of humankind to cope" and that whilst the biggest impacts would be felt by developing nations, even "affluent communities would see substantial and unprecedented changes to how they live, while for the majority, fundamental transformations might be necessary for survival" (p.473, Rockström et al., 2009). The science suggests urgent action is needed to prevent catastrophic consequences, and as is widely agreed, this needs to happen on two fronts – mitigation and adaptation.

2.4 Preventing Catastrophic Consequences

It is widely agreed in the scientific community that to avoid catastrophic climate change, the concentration of CO_2 in the atmosphere needs to be stabilised, and to reach that level current emissions need to be reduced significantly (IPCC, 2007; Hansen et al., 2008; Mascarelli, L., 2008; Rockström et al., 2009). In mitigating emissions, a globally agreed upper level of CO_2 needs to be set, as well as the necessary action to reduce emissions to that level. There is discrepancy among the literature regarding the desirable stabilisation target, although most

conclusions are derived from the IPCC's earlier AR4 and not attributed to more recent research – particularly that of Hansen et al. (2008) (Mascarelli, L., 2008; Rockström et al., 2009). The stabilisation debate is amplified beyond the scientific community and in most published cases draws conclusions based on the AR4 (Stern, 2007; UNDP, 2007; Hawkins et al., 2008; Morgan et al., 2009).

As previously stated, for the past 10,000 years and up until pre-industrial times, the level of CO_2 has not exceeded 280ppmv. Since the rise of the industrial revolution the level has risen significantly, and is now above 385ppmv. Whilst the IPCC in its AR4 (2007) and others since, have recommended stabilising between 450-550ppmv, many regard the likely resulting rise in temperature of 2-4°C and its associated consequences too grave (Hansen et al., 2008; Athanasiou, 2009; New et al., 2009; Rockström et al., 2009). Hansen et al. (2008) in more recent research conclude that the safe upper level for humanity is 350ppmv, and should therefore be the target for stabilisation. A recent article, 'A Safe Operating Space for Humanity' is consistent with conclusions of Hansen et al. (2008), in that the safe upper limit should be no higher than 350ppmv (Rockström et al., 2009).

As the stabilisation debate continues among scientists, the agreed targets scientifically are not always agreed elsewhere. It is the role of science to determine the facts to influence governing policy, but ultimately, it is the policy makers who will determine what the targets will be. Yet as suggested by the fact that policy makers, having known about the problem for the past 30 years, and having allowed the increased rise in emissions to date, the situation does not look good. As suggested by Hawkins et al., "whatever our future target for emissions stabilisation – 450, 350, 300 – we ought to be doing much more than we are now" (Hawkins et al., 2008).

2.5 Climate Change and New Zealand

New Zealand is both a contributor to the problem of climate change, and is a recipient of its impacts. Although greenhouse gas emissions as a nation are relatively low, per capita they are among the highest in the developed world (Ministry for the Environment, 2007). A study in 2008 placed New Zealand's ecological footprint at sixth highest in the world, implying that the quality of life experienced by New Zealanders has adverse implications for crucial life-supporting processes provided by ecosystems – further contributing to climate change (WWF, 2008a).

New Zealand has a unique emissions profile. Almost half of New Zealand's greenhouse gas emissions consist of methane and nitrous oxide produced by agriculture, especially farm animals (i.e. methane mainly from ruminant animals and waste management; and nitrous oxide from dung, urine, and nitrogenous fertiliser) (Ministry for the Environment, 2007; Landcare Research, 2009). The bulk of New Zealand's CO_2 emissions are attributed to transport and electricity sectors (Ministry for the Environment, 2007). It is suggested that because the strength of New Zealand's economy rests on it's exports (primarily agriculture) and tourism, two industries particularly afflicted with an addiction to fossil fuels, reducing CO_2 emissions is seen as a significant challenge (Ministry for the Environment, 2007). Also when compared to other nations, New Zealand's energy supply profile is largely comprised of renewable energy supplies.

Like other remote places on Earth, New Zealand is already experiencing the effects of climate change, and will be increasingly affected in the future (IPCC, 2007; Ministry for the Environment, 2007; NIWA, 2009). New Zealand's climate is notably diverse, yet while it differs to global averages, it follows the same warming trend (Renowden, 2007). For example, while the global average temperature rose 0.6° over the last 30 years, New Zealand warmed only 0.4° (Renowden, 2007). Owing to the fact that oceans warm slower than the land, the large bodies of water that surround New Zealand – the south Pacific Ocean and the Tasman Sea, provide an 'air-conditioning' buffer, resulting in slightly less warming compared with that experienced globally (Renowden, 2007). Though relatively little is known about the specific regional impacts of climate change, New Zealand will have it's own unique challenges (IPCC, 2007).

Impacts, as projected by the New Zealand Government's Ministry for the Environment, are drawn mostly from the IPCC's AR4. Generally, these suggest that the South and West will become increasingly wetter, as opposed to the North and East becoming increasingly drier. Among other impacts, an increase in extreme weather events, and a significant loss in biodiversity are also expected (IPCC, 2007; Ministry for the Environment, 2007). The AR4 suggests New Zealand's most vulnerable sectors will be natural ecosystems, water security, and coastal communities (IPCC, 2007; Ministry for the Environment, 2007). With much of New Zealand's population residing in low-lying coastal areas, the effects of sea level rise, increased coastal erosion, and storm surges pose threats to existing and future development.

In it's projection of 0.18m-0.59m sea-level rise, the Ministry draws upon the AR4's

conclusions that now conflict with more extreme predictions of recent research – hence, the threats may be underestimated (IPCC, 2007; Ministry for the Environment, 2007; Richardson et al., 2009). Even more vulnerable to the threat of rising sea levels and increased extreme weather events, are New Zealand's less developed neighbouring islands in the more tropical Pacific. And, with New Zealand's projections looking comparatively stable, it's not unlikely that it might become an increasingly desirable place for climate refugees (Renowden, 2007). And, as Renowden (2007) puts it "whatever happens to our climate, we will not be able to escape the indirect effects of the climate change suffered by our neighbours and overseas trading partners." (p.78, Renowden, 2007).

Chapter Three: The Context for Action: Responsibility, Education, & Urgency

"Human progress is neither automatic nor inevitable. We are faced now with the fact that tomorrow is today. We are confronted with the fierce urgency of now. In this un-folding conundrum of life and history there is such a thing as being too late...We may cry out desperately for time to pause in her passage, but time is deaf to every plea and rushes on. Over the bleached bones and jumbled residues of numerous civilizations are written the pathetic words: Too late."

(King, 1967)

In his speech on social justice delivered over four decades ago, Martin Luther King's words resonate strongly with the confronting issue of climate change (UNDP, 2007). The overarching notion that the climate is changing due to human-activity is consistent with the conclusions of over 30 years of rigorous scientific research. In our delay to stop burning fossil fuels, future projections of the implications and consequences grow increasingly grim. And, as the world waits for the slow wheels of policy to set stabilisation targets and outline the path for mitigation and adaptation, the early impacts of climate change set in. The issue of climate change is not just an environmental challenge, nor is it confined to science or policy, it is first and foremost a human issue (Cameron, 2009).

3.1 The Vulnerable and the Responsible

Every human being alive on Earth in the coming decades will be affected by climate change (UNDP, 2007). For those in developing countries, the impacts will be far greater (Christian Aid, 2007; IPCC, 2007; UNDP, 2007). The idea that every low lying coastal community worldwide will have to meet the challenges of sea-level rising 1-2m by 2100; that between two and three billion people will be exposed to water shortages as glaciers melt; that the already millions of hungry people surviving on subsistence-style farming and fishing will suffer exacerbated food shortages as agricultural and food systems fail; are only a taste of the consequences of inaction (UNDP, 2007; Brown et al., 2008).

Buried beneath the joys of an increasingly interconnected global society is only one planet. Earth's capacity to support an increasing human population paired with rapidly increased consumption of resources – not to mention the needs of every other species on the planet; is fundamentally limited. Whilst some critics are cynical of the remaining time left to overturn

the unprecedented challenge, many are optimistic in that with swift, concerted action it may be possible to avoid some of the most adverse consequences (UNDP, 2007; Hawkins et al., 2008; Stern, 2009). The fundamental transition towards a low-carbon future needs to happen within the coming decade (UNDP, 2007).

In the accumulating list of crises humanity faces – population, pollution, poverty, energy, health, security, food, water, ecosystems, economy, the last and the most controversial and complex – climate change, is where we need to begin (UNDP, 2007; Athanasiou, 2009; Morgan et al., 2009). It is not surprising that many prominent organizations including the United Nations Development Programme, the World Health Organization, the World Bank, the Global Humanitarian Forum, WWF, Oxfam, Christian Aid, and many more now place climate change at the top of their agendas, and are united in their call for urgent action. Given the stakes, it is perhaps not surprising that climate change is referred to as 'the defining challenge of our generation' (UNDP, 2007; Stern, 2009). Such a statement suggests a moral obligation of the generations now. But such a vast and complex issue presents a conundrum – how might ordinary citizens engage in meaningful action to make a difference?

3.2 The Path Towards a Safe Climate Future

Advocate for urgent action, Professor James Sweeney of Stanford University frames tackling the problem in terms of ethics and responsibility – "we can let the future climate change related crises put our grandchildren in an impossible position or we can anticipate the growing problems and take action now." (Sweeney, 2008). Offering a slightly different perspective after four decades as a policy maker, advocate, and academic specialising in governance and the global environment shares his insights:

"If I were a young person being handed this problem by indulgent predecessors, I would be angry. For twenty years thoughtful people and intelligent leaders have known that we needed to get busy. Precious time has been wasted. And now a new generation has been given a climate problem that is deeper and more difficult. The current system of international efforts to help the environment simply isn't working. The design makes sure it won't work, and the statistics keep getting worse. We need a new design."

(Speth, 2005)

As suggested by both, radical action is needed. Because the specific implications of climate change vary in different parts of the world, so too do the solutions, yet suggested pathways for action follow similar trends. Generally, the solutions rest in a low-carbon future, with significant reduction in the dependence on fossil fuels especially oil and coal, paired with a transition towards renewable energies, such as wind and solar (Hansen et al., 2008; Hawkins et al., 2008). Because the fundamental building blocks of socio-economic systems will become increasingly challenged, strategies for food and water security and building community resilience will become increasingly important (UNDP, 2007).

The idea that climate change is a global problem, therefore requires a global solution is widely contested. It is argued that solutions need to be largely sought locally, and regionally, but obviously international collaboration is important (O'Brien et al., 2009). Archbishop, Desmond Tutu of South Africa comments articulates the current rift in international collaboration between developing and developed countries:

"No community with a sense of justice, compassion or respect for basic human rights should accept the current pattern of adaptation. Leaving the world's poor to sink or swim with their own meagre resources in the face of the threat posed by climate change is morally wrong...We are drifting in a world of adaptation apartheid."

(UNDP, 2007)

3.3 Resilient Low-Carbon Communities

At the heart of the climate change problem is consumption. Products and services available on the market are inextricably immersed in a fossil fuel driven economy – i.e., the processes associated with sourcing materials, production, distribution, and what happens to the product beyond its intended use (O'Brien et al., 2009). All of these processes influence the combustion of carbon, as well as how humanity affects the Earth's natural resources, the atmosphere, and the surrounding ecosystems (IPPR, 2009). Notions such as a 'price on carbon', 'carbon-footprint' and 'food-miles' are becoming increasingly referenced concepts proposed to facilitate the creation of low-carbon alternatives.

For some people, the choice to engage in low-carbon behaviour, such as choosing low-carbon public transport over taking more carbon-intensive options might be a simple consumption choice, whereas for others the scenarios and choices will be quite different. Such choices are

further influenced by many factors such as wealth, socio-economic status, geographic location, and the availability of alternatives, For ordinary citizens, families, and communities to engage in the necessary action to mitigate, adapt and build resilience in light of the expected challenges of climate change, the availability of alternatives and an education of engaging in 'carbon-positive' behaviour will play a critical role. Acknowledging what the science consistently reaffirms, and what global political processes consistently failed to implement, the need to empower communities to engage in 'ground up' strategies to transition towards resilient low-carbon futures is urgent (Hawkins et al., 2008). Emerging research into social and behavioural change as discussed in the next chapter, may provide powerful insights to aid this transition.

Chapter Four: Social Change & Empowering Action for Low-Carbon Communities

4.1 Defining Social Change

Given the context surrounding the climate change issue it assumed that educating for social change towards low-carbon communities is for the overarching benefit of individuals, communities, civilisation, as well as non-human life. However focusing on climate change as the problem, ignoring the underlying social, economic, and political influences that facilitate the subordination of the environment, is unlikely to change anything (O'Brien et al., 2009). This highlights the importance of systems thinking, whereby the economic and political systems can exist only within the sphere of the broader social system, which in turn exists only within the broader environment or 'Earth' system. To empower action within communities to foster positive low-carbon relationships between these mutually inclusive systems a deeper understanding of social systems is needed.

Social change is a process that has happened throughout history. Mobilisation to combat emerging challenges resulting in social change, is evident in examples such as previous world wars, apartheid, antinuclear campaigns, and in the recent and earlier 1930's financial crisis (Hawkins et al., 2008). Adaptation to climate change, as evidenced in the community visioning project by Gidley et al. (2009), is primarily a social process that takes place amidst the complex, interconnected nature of a region and community, and calls for the need to build more effective community partnerships, education, and agency. Enacted in a rural Australian community, the project is an inspirational account that illustrates adaptation to climate change at the community level is a 'co-evolutionary' process that requires active collaboration amongst community members in the re-visioning and development of low-carbon future scenarios (Gidley et al., 2009).

In the context of adapting to climate change, positive social change can be thought of as a process of transformation of social systems to result in empowering individual and collaborative low-carbon behaviour to build resilient communities through processes of education, organization, and mobilisation of individual and collective action. Because many social barriers exist that constrain the action necessary, it is important to understand these social conventions in order to engage in effective behavioural and ultimately, social change.

4.2 Behavioural Change

A multitude of programmes and campaigns designed by governments and organizations share the common goal of trying to effectively change behaviour. Many of these focus on changing health-related, or 'pro-environmental' behaviour. The framework for analysis is varied and generally covers a range of assessment criteria including internal (micro-sociological) and external (macro-sociological) variables (Moloney et al., 2009), whereby the internal variables or those occurring within an individual, influence awareness, knowledge, values, attitudes, behaviour, rational thought processes, emotional states, and/or habits. External variables are those outside of the individual, including their unique physical, social, and discursive environments. Whilst the use of such variables in the design and analysis of various behaviour change programmes overlaps, there is no universally accepted theory for behaviour change (Kollmuss et al., 2002; Jackson, 2005; Moloney et al., 2009).

One theory used to justify behaviour is the 'rational choice theory'. This was first derived from economics. The basic idea behind the rational choice theory as suggested by Green (2002), is that under prevailing conditions, people will do their best. The model alludes to market behaviour, based upon the fundamental premise that "the choices made by buyers and sellers are the choices that best help them achieve their objectives, given all relevant factors that are beyond their control" (Green, 2002). Since its development, the model spread into many areas of social science and has been adapted to what has become a dominant model of thinking and practice in the area of behaviour change (Jackson, 2005). However, the model has since become widely challenged.

Moloney (2009), questions the likely success of programs based on the rational choice model given its preoccupation with individual motivations, values, and beliefs. Other critics agree that rather than simple 'rational' cognitive decision-making, many of the choices people make are more emotional responses; that beyond self-interest, human behaviour is derived from social, moral and altruistic motivations; and that the model tends to ignore the broader social systems in which individual choices take place (Shove, 2003; Jackson, 2005; Guy, 2006; Moloney et al., 2009).

4.3 Barriers to Behaviour Change

There is common ground in climate change related literature regarding barriers to behavioural change. One such barrier, is that climate change is not easily perceived as an immediate threat – in that it lacks a face, and the dangers are often indirect, uncertain, and gradual, as well as geographically and temporally distant (Hawkins et al., 2008; AEDA, 2009). Through evolution, human brains have developed to respond to immediate threats (AEDA, 2009). This makes the need for education to prepare for long-term challenges particularly difficult. Furthermore, it is suggested that in the face of the climate change threat people feel powerless because it requires collaboration between individuals, businesses and governments (Miliband, 2006). This highlights the importance of empowerment and reinforcement as a key driver of social change. People need to feel their actions are making a difference.

Heiskanen (2009), highlights barriers to change as those created by the unavailability of alternative systems. In relation to consumption, the barriers created by the dominant supply chains, commercial interests and the supporting knowledge structures and conventions are embedded in carbon intensive technologies. This is further manifested when the knowledge, routines, and skills necessary to conduct everyday life are affected by the unavailability of low-carbon utilities such as electricity, water and waste (Heiskanen et al., 2009). In addition to the barriers that exist in urban infrastructure utilities, the media, who's coverage significantly shapes public understanding of climate change exacerbates controversy surrounding the issue, giving equal weight to science and hearsay, and dramatising 'doom and gloom' scenarios, further paralysing change (Carvalho, 2007). This emphasises the fact that change needs to be systematic – forging synergies both from 'top down' and from the 'ground up' approaches, and highlights the importance of strategic communication.

Moloney (2009) questions the success of many dominant behaviour change programmes due to three common flaws in their assumptions:

1) *Communicating the right information will lead to responsible behaviour change.* Simply communicating the information as to why a particular behaviour is negative alone is unlikely to achieve this effect, and enthusiasm for 'new' behaviour is likely to wane the desired behaviour in the absence of continual reinforcement (Dwyer et al., 1993).
2) *Presenting the facts about how behaviour is affecting the environment will lead to rational response and behaviour change.* Emerging evidence suggests the

opposite, in that responses vary depending on context, culture, emotional state, and that learning about climate change and its impacts can vary from disinterest and disempowerment, to scepticism and fear (Australian Psychological Society, 2008). The notion that trying to change attitudes or behaviour by simply presenting the facts, probability, or statistical evidence is flawed and is evidenced by research on the effectiveness of public health programmes (Hinyard et al., 2007).

3) *The prevalence of targeting individual behaviour over collective behaviour change*. This flaw is strongly emphasised in other literature, which highlights the importance of addressing the broader social systems in which individual behaviour takes place – i.e., failing to recognise the socially grounded nature of human behaviour (Jackson, 2004; Abroms et al., 2008; Heiskanen et al., 2009). Many campaigns that seek to encourage individual behaviour change may fail because they ignore the many social norm, network, community-level, and place-based barriers to change (Abroms et al., 2008).

In light of the above reasons why many dominant behaviour change programmes may fail, the obvious question is how might they succeed? In a review broadly representative of the literature surrounding previous research in behavioural change theory, Heimlich & Ardoin (2008) conclude that ultimately, eliciting behavioural change is based on three variables: (1) entry level (including sensitivity, ecological knowledge, androgyny and attitudes); (2) ownership (knowledge of issues, personal investment, knowledge of consequences and commitment); and (3) empowerment (including environmental action skills, locus of control and intention to act). For obvious reasons, influencing change may be most effective when each of these variables is supported at both the grassroots community and policy levels.

Research to date suggests that for the development of successful strategies to drive change towards low carbon communities, the consideration of individual psychological factors as well as the broader systems, standards, and norms in which they operate is fundamental. (Heimlich et al., 2008; Heiskanen et al., 2009; Moloney et al., 2009). Furthermore, positioning desirable behaviour change as an appeal to personal growth and/or community involvement may lead to more successful outcomes (WWF, 2008b). It is said that the feeling of 'helplessness' is the greatest barrier to change – and hence, raises the importance of inspiration or 'empowerment' as a key tool for social change (Heiskanen et al., 2009).

4.6 Empowerment

It is argued that collective empowerment is at the heart of social change (Drury et al., 2009). A sense of control and agency are important psychological factors to motivate behaviour, both individually and collectively (Moloney et al., 2009). Experiencing feelings of competence, confidence, and the capability take charge of one's life provides the most motivation for people (De Young, 2000; Kaplan, 2000). As evidenced throughout even the earliest studies in psychology, positive reinforcement or 'feedback' is an important mechanism for reinforcing behaviour change, and, important to counter feelings of 'helplessness' and disempowerment (Heimlich et al., 2008; Tukker et al., 2008).

Due to the perceived invisible nature of the climate change problem, Heiskanen at al (2009) suggest feedback is an important aspect of empowerment so that people feel their actions are making a difference. Feedback through various mechanisms has the potential to demonstrate that others are participating and hence, contribute to collectively making a significant difference. Even seemingly insignificant shared actions can play a role in building a powerful movement (Drury et al., 2009). Similarly, social learning and interaction through processes such as collaborative community visioning, shared-decision making, collective management of resources, and providing a space for participants' 'voice' in devising solutions are strong cases for feedback – reinforcing behaviours and further empowering social change (Heiskanen et al., 2009; Moloney et al., 2009). Moreover, supporting all practices that encourage a strong sense of shared identification (including through context) is important for empowering collective social change (Drury et al., 2009).

Whilst empowerment should be systematic and requires support from government, Thogersen (2006) suggests a top-down approach may be detrimental if too directive and can undermine motivation. Because many barriers are context specific, developing solutions for change at the grassroots or community level, and providing capacity and support for individuals' voluntary efforts is particularly important (Heiskanen et al., 2009). Also important and held in high regard is the value of 'system binding agents' or 'change agents' who facilitate action at the grassroots or community level by ensuring top-down support and working between grassroots and mainstream networks (UK Green Building Council, 2008).

Grassroots initiatives in themselves can play a key role in creating low-carbon communities.

Recent study of two grassroots initiatives demonstrated that even under circumstances of a lack in power and resources, change could be enacted in unique ways bringing together diverse social contexts and building capacity for change – even in a largely 'disempowered' community in one case (Middlemiss et al., 2009). Furthermore the emerging research suggests grassroots initiatives can draw on community capacity to break existing social boundaries and successfully instigate change towards low-carbon communities (Middlemiss et al., 2009).

As Drury and Reicher (2009) point out, whilst a social movement cannot initially change the wider social world it can increase the sense that a new world is possible. By doing so, it can (at least) create its own internal reality, so as to objectify it's social identity and empower its agents that this new world can be created. In the identification of desirable aspects of a world that does not yet exist (i.e., a low-carbon future), the visioning process can empower participants with the belief that they can create it. Empowering social change towards low-carbon communities therefore requires that architects of change foster new ideas, new ways of thinking and imagination – one way to stimulate such thought, is storytelling and the use of emerging media.

Chapter Five: The Power of Narrative to Inspire Change

To empower collective action, narrative is a fundamental device (Gidley et al., 2009). Humans have evolved to communicate with each other through stories – they shape our culture, our values, attitudes, beliefs, and our behavior. More specifically, narratives can enable memory, structure cognition, create meaning, establish identity, and can have a powerful effect on the audience by engrossing them; moving them emotionally; persuading; and ultimately motivating behaviour (Gidley et al., 2009). Furthermore, Gidley et al. (2009) notes that because narratives can be shared by engaging at the individual and collective level, narratives can enlist participation in common drama, and motivate collective acts of meaning. For these reasons, narrative is used widely in programmes for behaviour change (Novacek, 2008). By contrast, emerging evidence suggests that non-narrative forms of communication are less personal, realistic, believable, memorable, and therefore less effective at changing behaviour (Hinyard et al., 2007).

Narrative is therefore a powerful tool for communicators and leaders of social change. It can assume and integrate various forms such as folk stories and legend, drama, historical accounts, personal experience and the experience of others. Gidley et al. (2009), suggest that in the face of the threats posed by climate change, the critical first step towards building community resilience is beginning the dialogue of understanding probable, possible, and preferred futures. Thus, there is significant opportunity to begin such dialogue, as well as portray such futures, through the use of narrative. Of course, there is significant discrepancy between simply educating an audience about a problem, and motivating the action to solve it. Hence, any strategy to empower action through narrative needs to begin by understanding the available tools and the intended audience.

As previously noted, there exists significant and complex sensitivity among audiences regarding the issue of climate change. Research suggests the use of fear, shock, or sensationalisms may have an overwhelmingly 'negative' impact on an audience's engagement with climate change. (O'Niell et al., 2009). However, such negative elements can be powerful hooks if used selectively 'with caution' and partnered with more 'positive' representations including ways in which the audience can positively respond to such challenges (O'Niell et al., 2009). Furthermore, "when audience members become more immersed in a narrative, they are less likely to counter argue against its key messages", and, "when they connect to the characters in the narrative, these characters may have greater influence on the audience

members' attitudes and beliefs" (Hinyard et al., 2007). This highlights the importance that narratives need to be engaging, and are strategic in use of characterisation.

Research suggests that the accounts of individuals' as characters in narrative and their personal points of reference (e.g., values, attitudes, beliefs, local environment, and experiences) are more likely to meaningfully engage audiences around the issue of climate change (O'Niell et al., 2009). For complex social issues such as morality, religion, meaning in life, and values, where reason and logic have obvious limitations (such as the contesting the social norm, or limitations in the system that may be perceived by some as 'too hard to change'), the narrative mode of learning through other individuals' experiences maybe especially useful (Hinyard et al., 2007). When developing characters for narratives to effectively change behaviour, theories from psychology can provide useful insights.

5.1 Theories to Empower Behaviour Change Through Narrative

Drawing on previous studies in psychology, three relevant theories are identified by Hinyard and Kreuter (2007), each reinforcing the benefits of strategic use of characters for narratives to elicit behaviour change. The first of these is Social Cognitive Theory (Bandura, 1977). This theory asserts that if a model is observed engaging in behaviour that is seen as appealing then individuals are more likely to engage in that behaviour themselves. Role models, as evidenced by Social Cognitive Theory, should have significant influence on the development of entertainment-education narratives. Further more, studies have demonstrated the use of personal experience in narrative can promote observational learning and increase self-efficacy (Hinyard et al., 2007).

The second theory known as the Precaution Adoption Process Model (Winstein, 1988), suggests that when the audience is exposed to characters in the narrative that are perceived as similar to themselves, results suggest participants are more likely to engage in the demonstrated behaviours. This is further proven by Griskevicius et al. (2008) in studies reflective of various types of communications to elicit behaviour change. This emphasises the need to develop narratives with a 'target audience' in mind (Hinyard et al., 2007). A strategic target audience focus is also largely reflective of social marketing principles (Heimlich et al., 2008).

The third theory, the Theory of Reasoned Action (Ajzen & Fishbein, 1980) relates to the

influence of social norms, and normalised behaviour. The perception that others (individuals and groups, even strangers) approve of certain behaviour can influence the audiences' intention to engage in that behaviour – even more so if those characters in the narrative are perceived as important, valued, or credible. In addition, the beliefs, views, and behaviours demonstrated by perceived 'important' individuals and groups are most likely to lead to attitude and behaviour change (Zimbardo et al., 1991). Furthermore, if characters in the narrative are perceived as important, they are more likely to position behaviour as normative (Hinyard et al., 2007).

Narratives that make social norms salient can be powerful levers for change. Research suggests that when designing communication to change behaviour, depicting the behaviour that is desirable – as opposed to the undesirable behaviour, is critical (Griskeviscius et al., 2008). This has especially strong impact on audiences' because due to conditions of uncertainty, most people tend not to look inside themselves but to others – especially similar others for evidence of how to act (Griskeviscius et al., 2008).

5.2 The Flexibility of Narrative

Narratives are powerful because they can be told through a diverse variety of media channels. Translating a narrative to different forms of media may offer the potential reach a broader audience, and provide new opportunities to reinforce behaviour change. Obviously, the rise of the internet has had considerable implications and contested the relevance of using conventional media channels (such as print, radio, television and film) for behavioural change. At the same time, the internet with it's ever-expanding functionality offers many advantages for unifying conventional forms of media (especially radio, television, and film). The greatest challenge for communicators is of course the over-saturation of any potential channel from competing communications.

The type of media channel can influence the effectiveness of how narratives are processed and their potential to elicit behaviour change. Whilst these notions are supported by a large body of research, as documented by Hinyard and Kreuter (2007), there are notable gaps in how narratives are processed across different types of media. The effectiveness of narrative as communicated through specific media however, has been subjected to investigation – one area of interest in particular, is documentary film.

5.3 Documentary Film as a Narrative Catalyst for Change

With the potential to dynamically fuse narrative, drama, evocative imagery, music, sound, and more, the power of film to engage, educate, and empower action is becoming more widely appreciated (Chiu, 2009; Larøi et al., 2009; Nisbet et al., 2009). The role of documentary as a tool for sparking public debate and become a tool for change is becoming better understood through the analysis of a growing list of films such as *An Inconvenient Truth*, *The Age of Stupid*, *Super Size Me* and *Food Inc*, but also through case-studies research in participatory video projects. As opposed to earlier ideas that documentary films simply influence change through mass education and/or mass mobilisation, it is suggested that the impact of many 'activist documentary films' is more complex and can influence change through recruitment, education, mobilisation, and framing the relevant activist organizations of which they are a part (Whiteman, 2009). Of course that is not to suggest that 'activist groups' cannot influence change. The insights provided by emerging theories of behaviour change suggest documentary film is only in its early iterations of what is becoming better understood as an increasingly powerful tool for change.

Documentary film's effectiveness to reach and influence an audience may be largely amplified by the additional use social networking, distribution, and reinforcement from supporting advocates, audiences, activist groups, and organizations. With this in mind, attention to strategically engaging in the production process of a documentary film is critical. In its simplest form, the production of a film can be broken into three parts: pre-production (i.e., story development; character and location development); production (i.e., the shooting and sound recording); and post-production (i.e., editing, graphics, and sound design); and with the additional processes of marketing and distribution. With this in mind, it seems important to strategically develop the narrative to appeal to the interest of such 'advocates' and 'interest groups', to find ways to strategically engage many participants in the creation process of a film, thereby empowering a sense of co-creation or co-ownership, and to pair strategic use of emerging media and social innovation to distribute the film once complete.

The idea of social innovation through 'participatory video', or what Berry (2003) refers to as the 'socially engaged' mode of documentary filmmaking, has important implications for empowering change. When the making of documentary is grounded in community, whereby participants of the community have an active role in the filmmaking (or through characters) the film has instant relevance and thus, is particularly influential for the local community.

(Berry, 2003). This is supported by a recent community health-focused study that illustrates that the process of documentary filmmaking may be most effective as a tool for change when it critically engages with communities to partake in the activities being filmed – building a degree of participant' ownership in the film (Chiu, 2009). A different health related study that assessed film as a tool for attitude change concluded that the portrayal of 'real people' as those affected by a problem or passionate about a cause, is more effective than using 'experts' who provide explanations about the problem. Also of importance is that the target audience perceive the characters in the film as similar to themselves. The study did not, however, measure the films effectiveness in changing behaviour and thus, further research here is needed (Larøi et al., 2009).

The idea that documentary can make a difference is widely hypothesised, but rigorous quantitative and qualitative analyses into the resulting impacts are lacking. Evidently narrative can be a powerful tool to empower behaviour change, but documentary film, despite its growing influence (as noted by Nisbet et al. (2009)), is largely overlooked by social scientists. Of course film is only one medium to communicate narrative, though arguably one of the richest forms for engaging audiences. Narrative may be most effectively employed as a tool for behaviour change when reinforced through a variety of media. The documentary film produced as part (ii) of this thesis, *Carving the Future*, is currently engaged in a variety of media in the process of trying to empower change in the context of New Zealand.

5.4 Carving The Future

The film *Carving the Future* is largely informed by the research from this review. The film tells the story of how one person can make a difference. Told through a group of young New Zealanders, each leading unique solution-foucsed community action projects in their regions. Each character draws their motivations from context of 'solving future challenges' and working alongside a global social movement for action on climate change.

The film is designed specifically to engage young New Zealanders, aged 16-25, around climate change and its associated challenges, and to empower them both as individuals and as wider social groups to get active in building community resilience in the context of New Zealand. The film is the product of two combined masters students' collaborative efforts (Guy Ryan & Nick Holmes), whereby both students contributed equally to every aspect of the films production including story development and scripting, shooting, and editing.

The vision for the film was multi-layered:

(1) to demonstrate the power of both individual and collective action
(2) to present the challenges of climate change and environmental degradation in local, national, and global contexts through powerful personal stories
(3) to portray what 'one person can do' in a practical, tangible way
(4) to tell a story that provokes thought and inspires action

The delivery requirements of this thesis required the film to be exactly 25 minutes in length. Given the film's predetermined time limit, and a relatively complex vision, there were significant challenges for the creation of the film – especially in the pre-production (story development and planning) and post-production (editing) phases of the film.

In attempt to achieve the vision, the film's structure took on a non-linear approach to storytelling involving three main characters (Erana Walker, Jinty MacTavish, Louis Brown), a narrator (Te Rawhitiroa Bosch), and two lesser characters (Bill McKibben, Aschel Gregory). Each of the three main characters' story was planned into three parts or 'mini-stories' which could be broken down into a three-act structure of (i) individual action, (ii) the power of collective action, and (iii) challenges. Through editing, the film presents just one part of the three-act structure from each character subsequently. For this film, the non-linear approach to storytelling effectively helps to create a more coherent emotional journey across multiple characters than could otherwise be achieved through a linear narrative. Then, each combined 'act' is woven together by the narrator or 'storyteller' who delivers the narrative on stage to a high school audience through his genuine first person experience, with emphasis beginning with the power of 'one person' and progressively shifting towards the power of 'collective action'. Amongst the high school audience is a young girl, a skateboarder, who represents a metaphor for the audience watching the film – in learning about these other young New Zealanders 'leading change', she too realises she can take action, and becomes a part of the movement.

Finding three strong characters to engage a diverse New Zealand youth demographic was critical. Characters were chosen with careful attention to gender, ethnicity, geographic location, personality, age, and the nature of the characters endeavours. It is intended that the use of multiple characters – each of strong influence amongst peers within their respective communities, will appeal to the target audience, and with these characters engaging only in

behaviour which is desirable (i.e. community engaged low-carbon behaviour) it will inspire the target audience to engage in similar behaviour. The main issue or challenges of the film are intentionally presented in the third quarter of the film because, as revealed by theory from psychology, when the audience' is more immersed in the narrative they are less likely to argue against its key messages.

Despite the significant body of scientific research surrounding the climate change issue the film intentionally avoids going into detail for several reasons. Most importantly, because powerful personal stories as told through characters in the narrative are more effective at changing behaviour than facts or statistics. Secondly, because personal stories – attitudes, values, and behaviours as displayed by influential characters in the narrative are more likely to help position the desired behaviour as normal.

The film has been designed to portray a strong sense of community engagement. Throughout the process of filmmaking attention was given to supporting the film's characters in designing events that brought together multiple participants from respective communities. The presence of the video cameras and crew throughout the community action (as led by each of the respective characters in the film) certainly had noticeable impact on other participants' enthusiasm for being engaged. It is expected that upon viewing of the final film, participants of the respective actions will further understand the importance of their actions and be empowered to further engage in similar behaviour – of course this is yet to be analysed and poses opportunity for further study.

The film will be promoted as an educational resource for use in secondary schools across New Zealand. But beyond an educational resource in New Zealand the film has been designed to have strong ties to the global citisens-based movement *350.org* – a movement grounded in the research by Hansen et al., (2008) in that the global target of atmospheric CO_2 should not exceed 350ppmv. In addition, the film is also intricately woven into a New Zealand based network of young professionals called 'ReGeneration' – born out of The Enviroschools Foundation, the 'ReGeneration' network consists of hundreds of passionate and purposeful individuals from around New Zealand, of which all of the young characters in the film identify themselves as part of. The end of the film brings together actions beyond New Zealand from the most widespread political action in history, whereby participants from more than 180 countries engaged in over 5000 collective actions on a single day – October 24 2009, in the call for bold action to combat climate change. It is intended that strategically tying this

movement, and the 'ReGeneration' network into the film will pose significant benefits for more widespread distribution and spread the message of the film further.

Other opportunities to empower change through the narrative of the film are also currently being actively pursued. One way is using the internet (www.carvingthefuture.com) as a portal to make the film easily accessible, which in itself can be promoted through various online networks, and also serves as a platform to further reinforce the narrative and empower change. Another way is providing easily accessible community-based film screenings around New Zealand – the filmmakers travelling with the film in attempt to stimulate conversation and inspire action amongst grassroots New Zealand. This may also serve to further promote the online availability of the film as a resource whereby the audience can be encouraged to download the film and host independent 'community-screenings'.

Chapter Six: Conclusion and Recommendations

Climate change is a complex issue that will increasingly affect all life on Earth. For over 30 years scientific evidence has consistently reaffirmed that through the combustion of fossil fuels and mismanagement of the Earth's resources, human activity is causing the climate to change to the extent that it will increasingly threaten life on Earth. This may also lead to abrupt and irreversible tipping points with consequences that could be catastrophic. As something that will increasingly challenge human development in the coming decades, addressing climate change requires urgent attention. Yet there exists a significant rift between scientists, policy makers, and the general public to design and action the necessary mitigation and adaptation strategies in order to avoid catastrophic consequences. While leadership is emerging, current actions are slow.

The current greenhouse gas emissions profile is aligned with the worst cased scenarios as projected by the world's most authoritative scientific research bodies (IPCC, 2007; Richardson et al., 2009). The ramifications of these projections are far more extensive than the direct impacts of sea-level and temperature rise and include species loss, food and water shortages, spreading of disease, ocean acidification and much more. However, adequate response to mitigate and adapt to the projected consequences is further complicated by industry and organizations that seek to gain, by perpetuating the use of fossil fuels and carbon-intensive technology, as well as the mainstream media that has largely served to create unnecessary controversy and cloud public understanding. Evidently there are significant barriers to successfully addressing the issue, but it is the view of this thesis that such barriers can be overcome.

For a safe climate future, a fundamental societal shift is required – away from carbon-intensive behaviour towards clean, renewable technologies, low-carbon lifestyles and resilient communities. Insights from social and behavioural change research provide valuable insights to empower the necessary change, and successful cases are already emerging. Overcoming the many barriers to change can be overcome and requires the consideration of individual psychological factors as well as the broader systems, standards, and norms in which they operate. Empowerment is a key aspect of successful behavioural change programmes – both at the individual and collective level and can be stimulated through continual reinforcement, collaborative community visioning, shared-decision making, and collective management of resources.

Narrative can be an effective tool to empower change. It can be effectively employed through the telling of powerful personal stories, whereby characters are role models for the desired behaviour. By contrast, the dominant health-programme paradigm of simply stating facts or percentages as logic for behaviour change has now been proven largely ineffective and revised accordingly. Personal stories are most successful where the audience perceives the characters as influential and/or similar to themselves. Creating the perception that others, even strangers, approve of certain behaviour can influence an audiences' desire to engage in that behaviour. This highlights the importance of social norms, and that narratives that make social norms salient can be powerful levers for change. When the audience is more immersed in the narrative, they are less likely to argue with the presented content. Perhaps the most powerful aspect of narrative as a tool for change is that it can be easily translated to a variety of mediums.

Documentary filmmaking is a vehicle for narrative communication of particular interest given the nature of this thesis. However the fundamental power of documentary filmmaking as a tool for change rests in understanding effective use of narrative tools, and engaging in processes of social innovation throughout the filmmaking process. Such innovation can take form through participatory processes whereby the target audience plays an active role in the creation of the film, as well as strategic distribution of the film through various conventional and emerging technologies (the internet) that make the final product easily accessible, reinforce or further enhance the narrative of the film, and provide opportunities to reinforce behaviour change. While documentary is largely influential and the reviewed literature provides some insight, any research that evaluates documentary as an effective tool for behaviour change is currently limited and thus, poses significant opportunities for further research.

Finally, through deepened understanding of the problems and solutions surrounding climate change, paired with insights to empower social change through narrative, communicators can certainly play a large role in the transition towards resilient, low-carbon communities. If given the required urgency, empowering community resilience through narrative could help to avoid some of the most catastrophic consequences associated with climate change.

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